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Abstract

THE USE OF INORGANIC ION EXCHANGERS IN ACID MEDIUM FOR THE RECOVERY OF CESIUM AND STRONTIUM FROM REPROCESSING SOLUTIONS.

L.Baetslé
Section Head

D.Van Deyck

D.Huys

A.Guery
Fellow on leave from Israeli Atomic Energy Commission, Israel

Waste Disposal Research Laboratory
Centre d'Etude de l'Energie Nucléaire (C.E.N.)
MOL (Belgium)

operated by the Société Belge de Chimie Nucléaire (BELCHIM)

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The search for new synthetic mineral ion exchangers exhibiting selective uptake of long lived fission products has led to the elaboration of a separation scheme for cesium and strontium from reprocessing solutions.

Zirconium phosphate, whose chemical, physical and radiochemical properties are reported in connection with its structure shows selective ion exchange properties for cesium in acid medium. The loading of cesium reaches a maximum of 0.2 me/g when a solution containing 0.5 g/l cesium and 0.5 N in acidity is fed to the zirconium phosphate in the H^+ form. That corresponds to a concentration factor of about 60.

The results are presented for several types of reprocessing solutions a.o. those reported by the Hanford, Windscale and Marcoule plants and those expected at the Eurochemic plant.

A new family of synthetic ion exchangers was found by precipitating in acid medium Na_2MoO_4 or Na_2WO_4 solution with $H_4Fe(CN)_6$.

"The ferrocyanide molybdate ion exchanger" has an extremely high affinity for cesium which allows the separation of the latter nuclide from reprocessing waste solution of 2 M HNO_3. A concentration factor of nearly 100 may be achieved leading to a maximum loading of 0.5 me/g at this high acidity.

The difficulties encountered with the strontium separation in acid medium and in the presence of bulk ions are outlined but some promising results were obtained with clinoptilolite after dilution of the feed solution.

An experimental set-up built for the separation of strontium and cesium with mineral ion exchangers is reported with emphasis on its technology.